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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/001,423 | 12/03/2001 | Tapesh Yadav | A21 | 4189 |

25235 7590 03/27/2003

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EXAMINER

RAEVIS, ROBERT R

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2856

DATE MAILED: 03/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/001,423

Applicant(s)

YADAV ET AL.

Examiner

Robert R. Raevis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 21-29 is/are pending in the application.
- 4a) Of the above claim(s) 3-6, 8-12 and 22-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 7 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Election of claim 21 (nanomaterial including zinc that is sensitive to hydrogen) is acknowledged.

The drawings are objected to because Figure 2C is not labeled such in the drawings. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance. ✓

The disclosure is objected to because of the following informalities: the Brief Description of the Drawings does not refer to Figures 2a, 2b, 2c, 4a, 4b, 5a, 5b. ✓

Appropriate correction is required. ✓

Claims 1, 2, 7 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7/13/07
As to claim 1, what does "quantum-confined" physically mean in this apparatus claim? Also, what does the term ~~—nano—~~ add to the term ~~—material—~~ in "~~nanomaterial~~"? ^{compos} ^{nanomaterial}
What is a "~~nanomaterial~~"? ^{nanocomposite} Is the term "nano" related to a weight, mass or dimension of some type? O/R

Claims 1, 2, 7 and 21 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. As to claim 1, how is a "~~nanomaterial~~" made such that it is "quantum-confined"? ^{nanocomposite}

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b0) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shigekuni (JP 08261979). ✓

Shigekuni teaches a device comprising, laminated structure including 10nm layers of metal layer and 10nm layers of Silicon dioxide, the device applied as gas detector, thus sensitive to gas.

As to claim 1, the term "nm" seems to be suggestive of nanometer, thus making the material "nanomaterial". Also, gases are reactive, and thus are chemicals to that extent. ✓

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al in view of Barbee, Jr. et al. ✓

Chen et al teach a sensor, including: layers of dielectric and electrodes, but the layers are not "nanomaterial". ✓

As to claim 1, Chen's "Depending on the deposition method" (col. 4, line 52) reference suggests any deposition technique, suggestive of Barbee's (col. 7, lines 50-

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56; col. 8, lines 20-30) sputtering technique that uses nanostructure materials. The term "nanostructure" material suggests nanomaterial as claimed.

Claims 1, 2 and 7 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over any one of Hoenig et al, Cheng et al, Sibbald et al or Volt.

Hoenig et al teach a hydrogen (col. 1, line 23) sensor that employs "electrode" (col. 1, line 34) and hydrogen sensitive material (col. 7, lines 20-25) with nanometer size ("nm" on col. 7, line 15) dielectric layer. ✓

As to claims 1, 2 and 7, the layers may be deemed to be laminate, and the nanomaterial is confined with respect to the sensor structure.

^{u63}
Chen et al teach a "hydrogen" sensor employing nanometer ("nanometers" on col. 3, line 33) material. ✓

As to claims 1, 2 and 7, the layers may be deemed to be laminate, and the nanometer material is confined with respect to the sensor structure. Also, leads 42 suggest electrodes.

Sibald et al teach a "hydrogen" sensitive sensor employing "electrode" (col. 2, line 60) and nanomaterial ("nm" on col. 3, line 6). ✓

As to claims 1, 2 and 7, the layers may be deemed to be laminate, and the nanomaterial is confined with respect to the sensor.

Claim 1, 2 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neuburger.

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Neuburger teaches a device for sensing gas, comprising crystal having a "50-200 nm thick coating of zinc" (col. 5, line 15).

Nueburger's written specification does not use the phrase "quantum-confined" or electrode.

As to claims 1, 2 and 21, the zinc is confined to a region on the crystal, and to that extent is "confined" as claimed. Also, the circuitry connections in Neuburger's detectors 122 pass electrical current, and to that extent are electrodes as claimed.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Voit teaches hydrogen sensor that employs 200 nm dimensions with respect to the layers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert R. Raevis whose telephone number is 703-305-4919. The examiner can normally be reached on Monday to Friday from 6:30am to 4:00pm. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4900.

Raevis

RAEVIS

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